Lake Okeechobee Protection Plan

Alternative Plan Evaluation Criteria

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Prepared by:

South Florida Water Management District

Florida Department of Environmental Protection

Florida Department of Agriculture and Consumer Services

Assisted by:

HDR Engineering, Inc.
West Palm Beach, Florida

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1.0 Introduction

This document is the preliminary draft of the evaluation criteria to be used to evaluate alternative plans that will be developed to achieve the goals of the Lake Okeechobee Protection Program (Chapter 373.4595, F.S.). It summarizes the evaluation criteria and provides detailed descriptions of the criteria and how they will be used to evaluate alternative plans. The information contained herein was developed by the Coordinating Agencies (South Florida Water Management District, Florida Department of Environmental Protection, and Florida Department of Agriculture and Consumer Services) in support of the overall program.

2.0 Background

Phosphorous loads from the Lake Okeechobee watershed have contributed to excessive phosphorous levels in Lake Okeechobee and downstream receiving waters. Therefore, the Lake Okeechobee Protection Program (Chapter 373.4595, F.S., referred to as LOPA) was developed to achieve phosphorous load reductions to the lake from internal and external sources utilizing a phased approach. Initial load reductions will be based on the SFWMD's Works of the District Program. Subsequent phases will be based on the total maximum daily load (TMDL) established for Lake Okeechobee in accordance with Chapter 403.067 F.S.

The LOPA contains three requirements that involve the development of a long-term comprehensive plan for all actions required to meet the Lake Okeechobee TMDL by 2015. The actions include:

- Development of the Lake Okeechobee Protection Plan (LOPP);
- Development of a implementation plan for Phase II of the Lake Okeechobee Construction Project; and
- An initial evaluation of further phosphorous measures that will be required to meet the TMDL.

The LOPA requires that the LOPP be completed by January 1, 2004. In December 2002, the Coordinating Agencies developed a work plan that describes the steps and schedule to meet the January 2004 deadline. The work plan outlines a step-wise process to be followed during formulation of the selected plan. The process includes:

- Development of evaluation criteria;
- Formulation of alternatives;
- Evaluation of alternatives:
- Comparison of alternatives; and
- Selection of the plan.

This document summarizes the development of the evaluation criteria.

3.0 Evaluation Criteria

The product of this task is a set of evaluation criteria that will be used by the Coordinating Agencies to evaluate potential alternatives for reaching compliance with the TMDL. Each alternative will consist of a combination of components that might include agricultural BMPs, urban BMPs, regional treatment facilities, etc. that would collectively meet the TMDL.

The evaluation criteria represent the major factors that would be used to evaluate alternatives and select the recommended plan. They also support the overall goals and objectives of the project. Each evaluation criterion consists of the following components:

- **Description** – what the criteria is measuring and why.
- **Rationale** – description of why the criterion is useful for measuring project results, which will assist in determining the weighting or relative importance of each criterion.
- **Target** – description of how performance will be measured for the evaluation criteria and what will constitute success (or failure) and procedures for scoring various levels of performance.
- **Methodology** – description of how the performance of the alternatives will be evaluated. Most evaluations will be subjective using best professional judgment. The methodology provides descriptions of specific considerations that will apply for subjective evaluations. For criteria where quantifiable measures are possible within the available timeframe, the methodology provides specific descriptions of the models, computations, analyses, etc that will be required to evaluate performance.

An interagency workshop was held on January 24, 2003 to develop the evaluation criteria and sub-criteria. During the workshop, selected Coordinating Agency members were identified, based on their qualifications and expertise, to develop detailed descriptions of the components. Appendix A contains a summary of the evaluation criteria followed by detailed fact sheets (Appendix B) for each of the criteria and sub-criteria.

Appendix A – Evaluation Criteria Summary

Evaluation Criteria	Evaluation Sub-Criteria	Evaluation Criteria Components			
		Description	**Rationale**	**Target**	**Methodology**
How will results be measured		What is being measured and why	Technical basis for why criteria is being used	Description of how success or failure will be measured	Description of tool to be used
Protect Native Flora and Fauna (in lake)	Reduce Exotic Species	Effectiveness of programs to reduce or eliminate exotic plants in the lake	Exotic plants, including torpedograss and melaleuca, have severely damaged the habitat in the lake's littoral zone	Zero or maintenance levels of exotic plants	Estimated acres per year of control, long-term effectiveness per unit cost, and extent of non-target species impacts
	Protect or Enhance Native Flora and Fauna	Opportunity for expansion of native plants and animals due to control of exotics	Native plants, which provide habitat for fish, wading birds, and other wildlife, are expected to increase as a result of exotic control projects mandated by the LOPP	Substantial increase in spatial extent of submerged and emergent native aquatic plants, and their associated animal communities	Estimated benefits, in terms of potential new habitat created by removal of exotic plants.
	Impact State-Listed Species	Restore and maintain the biodiversity of native habitat to aid in the recovery of state-listed species	Loss of habitat through land use conversions, wetland drainage, hydrology alterations, and water quality degradation are often limiting factors for many species.	No decline in abundance of state-listed flora and fauna species.	Estimated benefits, in terms of potential new habitat created, and protection of existing habitat.
Protect Native Flora and Fauna (Watershed)	Reduce Exotic Species	Management of existing invasions, or the monitoring of future invasions, of the primary exotic plant and animal species within the Lake Okeechobee Watershed.	Pursuant to 373.4595 (3) (e), F.S. the Lake Okeechobee Exotic Species Control Program was developed to 1) Identify the exotic species that threaten native flora and fauna within the Lake Okeechobee Watershed and 2) develop and implement measures to protect native flora and fauna.	Maintenance control of exotics where control techniques are utilized on a continuous basis in order to maintain a plant population at the lowest feasible level.	1) Implement existing management plans, 2) assess and map extent of coverage, 3) conduct further research, 4) transfer of information, 5) treat with various control methodologies.

Evaluation Criteria	Evaluation Sub-Criteria	Evaluation Criteria Components			
		Description	**Rationale**	**Target**	**Methodology**
How will results be measured		What is being measured and why	Technical basis for why criteria is being used	Description of how success or failure will be measured	Description of tool to be used
	Protect, Enhance or Create Native Flora and Fauna (1 Improve hydrology, 2 Protect)	Opportunity for expansion of native plants and animals due to control of exotics, and through improvements in natural hydrology.	Under LOPA, the Lake Okeechobee Exotic Species Control Program was developed to 1) Identify the exotic species that threaten native flora and fauna within the Lake Okeechobee Watershed and 2) develop and implement measures to protect native flora and fauna.	Increase in spatial extent of native habitat.	Estimated benefits, in terms of potential new habitat created, and protection of existing habitat.
	Impact State-Listed Species	Restore and maintain the biodiversity of native habitat to aid in the recovery of state-listed species.	Loss of habitat through land use conversions, wetland drainage, hydrology alterations, and water quality degradation are often limiting factors for many species.	No decline in abundance of state-listed flora and fauna species.	Estimated benefits, in terms of potential new habitat created, and protection of existing habitat.
Achieve State WQ Standards	Meet Other WQ Standards in Lake Okeechobee	Compliance with water quality criteria (62-302, FAC)	LOPA requires that water quality standards are to be achieved and maintained in Lake Okeechobee, its watershed and downstream receiving waters	Zero or minimal exceedances of water quality criteria in Lake Okeechobee	Estimate exceedances of water quality standards in Lake Okeechobee; and evaluate performance of technology/project and location of technology /project relative to Lake Okeechobee
	Improve Tributary WQ	Compliance with water quality criteria (62-302, FAC)	LOPA requires that water quality standards are to be achieved and maintained in Lake Okeechobee, its watershed and downstream receiving waters	Zero or minimal exceedances of water quality criteria within tributaries	Estimate exceedances of water quality standards in tributaries; evaluate technologies/projects for potential to exceed water quality standards and evaluate performance of technology/project and location of technology/project along tributary

Evaluation Criteria	Evaluation Sub-Criteria	Evaluation Criteria Components			
		Description	**Rationale**	**Target**	**Methodology**
How will results be measured		What is being measured and why	Technical basis for why criteria is being used	Description of how success or failure will be measured	Description of tool to be used
Maintain State WQ Standards	Identify/Control Changes in WQ from Projects/Technologies	Compliance with water quality criteria (62-302, FAC)	LOPA requires that water quality standards are to be achieved and maintained in Lake Okeechobee, its watershed and downstream receiving waters	Zero or minimal exceedances of water quality criteria from project/technology	Estimate exceedances of water quality standards from project/technology discharges; and evaluate ability to modify performance of technology/project
	Sustain performance	Long-term Compliance with water quality criteria (62-302, FAC)	LOPA requires that water quality standards are to be achieved and maintained in Lake Okeechobee, its watershed and downstream receiving waters	Zero or minimal exceedances of water quality criteria	Estimate exceedances of water quality standards in tributaries and Lake Okeechobee; and evaluate long-term performance of technology/project
Meet 2015 TMDL	Reduce External Phosphorus Loads to Lake Okeechobee	Opportunity to maximize the reduction of phosphorus loads to Lake Okeechobee	According to LOPP, phosphorus loads going to Lake Okeechobee must be reduced to restore Lake Okeechobee and downstream receiving waters	Maximize phosphorus load reduction to Lake Okeechobee according to the TMDL (140 tonnes)	Estimated change in phosphorus loading to Lake Okeechobee (tonnes/year)

Evaluation Criteria	Evaluation Sub-Criteria	Evaluation Criteria Components			
		Description	**Rationale**	**Target**	**Methodology**
How will results be measured		What is being measured and why	Technical basis for why criteria is being used	Description of how success or failure will be measured	Description of tool to be used
	Increase Exports & Decrease Imports of P from Watershed	Opportunities to increase exports of phosphorus from the watershed and/or decrease imports of phosphorus into the watershed	LOPP requires that phosphorus loads are reduced to Lake Okeechobee through the improved management of phosphorus sources within the watershed. Phosphorus source management requires nutrient balance of phosphorus, which includes importing less phosphorus into the watershed and/or exporting more phosphorus from the watershed.	Reduction in phosphorus imported into the Lake Okeechobee watershed and increase in the amount of phosphorus exported that would contribute to phosphorus loading to Lake Okeechobee	Estimated number of sources of phosphorus within the watershed and associated change in phosphorus load reductions to Lake Okeechobee
	Reduce Phosphorus Loads to Tributaries	Opportunity to maximize tributary phosphorus reduction	LOPA requires that phosphorus sources in the watershed are to be controlled and managed better to achieve and maintain water quality in Lake Okeechobee, its watershed and downstream receiving waters	Maximize phosphorous load reduction to tributaries	Estimated percent of tributary with lower phosphorous concentration and/or benefiting from phosphorous load reduction; and number of tributaries with reduced phosphorous concentrations and/or receiving reduced phosphorous loads
Minimize Negative Economic Impact on Land Owners	Cost Share and other incentives	Economic feasibility of the BMPs			

Evaluation Criteria	Evaluation Sub-Criteria	Evaluation Criteria Components			
		Description	**Rationale**	**Target**	**Methodology**
How will results be measured		What is being measured and why	Technical basis for why criteria is being used	Description of how success or failure will be measured	Description of tool to be used
Minimize Negative Economic Impact on Regional Economy	Regional Cost (tax base, jobs, etc)	The costs or benefits of a proposed P reduction alternative to the regional community in terms of changes in income defined as proprietor's income, interest, rents, profits, sales and household taxes.	Regional income can be positively or negatively affected by P reduction alternative implementation.	No negative impacts from P reduction alternatives implementation, such as a landowner going out of business, but an increase in regional income as investments are made to implement, maintain, and use the BMPs.	Existing IMPLAN Regional Economic Input-Output Model which simulates the supply and demand for good and services within a county or group of counties.
	Recreational Opportunities	Increase consumptive and nonconsumptive use of the BMP area by the public.	Offset any negative impacts of taking land off regional tax rolls due to BMP implementation	Any increase in fishing, birdwatching and waterfowl hunting would be a positive benefit to the region, since there is no public use now.	Estimated benefits of public use areas.
Cost	Maximize Federal Cost Sharing	The alternative will be evaluated to identify whether there are federal programs that might be available to provide all or a portion of the funding for its implementation.	The Lake Okeechobee Protection Act requires that the Lake Okeechobee Protection Plan be developed with a view towards maximizing federal cost sharing. This will relieve the economic burden on land owners and the participating state agencies and could increase the breadth of potential measures that could be implemented.	The Lake Okeechobee Protection Act requires that the level of federal cost sharing be maximized.	An inventory will be performed of all federal programs that could potentially provide funding for components of the LOPP. Each component of an alternative plan will be evaluated to determine if it might meet the requirements of any federal programs that might provide cost sharing. It will be assumed that the CERP project features will be in place for each alternative to be considered and therefore, will not be a factor in this evaluation.

Evaluation Criteria	Evaluation Sub-Criteria	Evaluation Criteria Components			
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How will results be measured		What is being measured and why	Technical basis for why criteria is being used	Description of how success or failure will be measured	Description of tool to be used
	Increase Public/Private Partnerships	Establishment of partnerships for the funding of regional projects that involve public-private sector cost sharing that will reduce phosphorus discharges into Lake Okeechobee, and generate a sharing of risk, responsibility and reward, and a net benefit to the public.	LOPA requires that the cooperating agencies develop a Public Private Partnership program. Competition for funding of regional reduction projects is the impetus for public-private cost sharing, with public benefits that include socio-economic impacts and public interaction with projects.	Implementation of a public-private regional project (s) that reduces P loads to the lake, and maximizes private financial contributions.	Objectives: Maximize P reductions and private money contributions, maximize engineering feasibility, maximize cost effectiveness while minimizing risks, maximize ease of implementation, maximize environmental benefits.
	$/lb of P removed (inflow) (must be evenly applied)	Average cost per pound of P removed by each P reduction alternative. This measurement is the present value of alternative P reduction costs divided by the present value of the reduction in P entering the lake due to the P reduction alternative.	Standardizes the cost-effectiveness of a P reduction alternative as it reduces P loads to Lake Okeechobee.	Comparing the cost per pound of P removed will assist in determining which P reduction alternative, or suite of alternatives, may be the most cost effective with respect to P removal.	Existing cost-benefit data for various P removal alternatives are available from several District technical studies that generated economic analyses.
Impact Existing Permitted Users	Impact water supply	The volume of increased or reduced surface water supply available	The quantity and quality of existing water supply is preserved at, or above the existing levels when the project is implemented.	Avoid any reductions in existing water supply in the watershed and if possible, to increase the availability of water supply.	This evaluation criteria will consider impacts on water supply in the Lake Okeechobee Watershed. Any potential changes in the availability of water supply from Lake Istokpoga will be quantified. Potential changes on water supply availability will be qualitatively evaluated based on interpretation of the model results.

Evaluation Criteria	Evaluation Sub-Criteria	Evaluation Criteria Components			
		Description	**Rationale**	**Target**	**Methodology**
How will results be measured		What is being measured and why	Technical basis for why criteria is being used	Description of how success or failure will be measured	Description of tool to be used
	Impact flood protection	The Program is not designed to enhance flood protection. Any impacts on existing flood protection will be reflected by changes in canal stages. Increases or decreases in the duration of high wet season canal stages will be evaluated. An increase in wet season canal stages will reflect an increase in flows and a corresponding reduction in the capacity to remove flood runoff. Conversely, a reduction in wet season canal stages will reflect additional flood runoff conveyance capacity and an enhancement of flood protection.	The level of service for flood protection is preserved at, or above the existing levels when the project is implemented.	The levels and duration of high wet season canal stages will remain at the existing levels to maintain flood protection. Lower canal stages or a reduced duration of high stages during the wet season will be an indication of enhanced flood protection.	The model results will be used to compare canal stages in the without project conditions with those for the alternative being evaluated. An increase (or a reduction) in the peak wet season canal stages will be considered as a flood protection reduction or enhancement, respectively. An increase or reduction in the percent of time with high canal stages during the wet season will likewise be considered a flood protection reduction or enhancement, respectively.

Evaluation Criteria	Evaluation Sub-Criteria	Evaluation Criteria Components			
		Description	**Rationale**	**Target**	**Methodology**
How will results be measured		What is being measured and why	Technical basis for why criteria is being used	Description of how success or failure will be measured	Description of tool to be used
Early Results	Early Load Reduction	Measure the ability of each plan to achieve significant load reduction toward the TMDL early in the implementation schedule	Phosphorus loading to Lake Okeechobee must meet the State's water quality standards by January 1, 2015. The TMDL is 140 MT/yr (105MT/yr from runoff). It will take approximately 30 years for Lake Okeechobee to naturally balance its internal loading once the TMDL is met. Achieving significant load reductions in the early stages of the plan will allow the Lake to begin its recovery earlier.	Plan achieving significant reduction earliest = highest score Plan achieving significant reduction latest = lowest score Score other plans by prorating accordingly	Estimate year when 50% load reduction will occur. Use implementation schedules from similar projects and load reduction performance for similar projects or from literature. If possible, account for actual loading to the Lake due to the plan's implementation.
	Early Implementation	Measure the ability of each alternative plan to achieve the TMDL prior to 2015.	Phosphorus loading to Lake Okeechobee must meet the State's water quality standards by January 1, 2015. The TMDL is 140 MT/yr (105MT/yr from runoff). It will take approximately 30 years for Lake Okeechobee to naturally balance its internal loading once the TMDL is met. Achieving the TMDL early will allow the Lake to begin its recovery earlier.	Alternative plan achieving TMDL earliest = highest score Alternative plan achieving TMDL latest, no later than 2015 = lowest score Score other plans by prorating accordingly	Estimate year when plan will fully meet the TMDL. Use implementation schedules from similar projects. If possible, account for actual loading to the Lake due to the plan's implementation.

Evaluation Criteria	Evaluation Sub-Criteria	Evaluation Criteria Components			
		Description	**Rationale**	**Target**	**Methodology**
How will results be measured		What is being measured and why	Technical basis for why criteria is being used	Description of how success or failure will be measured	Description of tool to be used
	Achieve Initial Phase of Phosphorous Load Reductions	SFWMD Technical Publication 81-2 establishes initial phase phosphorous load reduction. See Chapter 373.4595(3), F.S.	LOPA requires implementation of initial actions to achieve phosphorous load reductions based on SFWMD's Tech Pub 81-2	Zero or minimal exceedance of designated phosphorous load standards	Estimate exceedance of phosphorous load standards by land use category and evaluate performance of technology/projects.
Feasibility	Sensitivity to Weather	Measure of the ability of an alternative to reduce a greater amount of P load with increasing load conditions. Ability of an alternative to sustain performance under unseasonable weather conditions.	Alternatives selected should provide P removal commensurate with historical P loads and remain viable during and after adverse weather events.	Fraction of P load reduction for wet years compared to average years. Minimal or no performance affect by adverse weather events.	Technical Assessment (qualitative)
	Acceptability (Socioeconomic)	Socioeconomic impacts (beneficial and adverse), e.g. impact to residents, businesses, infrastructure, employment, health and safety, tax base, EJ, local stakeholder acceptance, etc.	Alternatives selected should minimize adverse local socioeconomic impacts and maximize beneficial socioeconomic impacts.	Beneficial socioeconomic impacts substantially outweigh adverse socioeconomic impacts.	Technical Assessment of Environmental Impacts (qualitative)
	Track Record	Measure or rating of the degree to which an alternative can be built and operated successfully.	Proven alternatives should be selected.	Alternative has been successfully implemented in the watershed or in a similar application elsewhere.	Technical Assessment including literature search (qualitative, level of confidence)
	Operations & Maintenance	Assessment or rating of operation and maintenance effort to sustain performance of the alternative and modify operation based on future changing conditions.	Alternatives requiring lower ongoing operational and maintenance efforts are more likely to sustain performance. Alternatives able to adjust operation are more likely to be viable in future years.	Alternatives rated as needing low to moderate operational and maintenance resources and high to moderate ability to provide operational flexibility.	Technical Assessment (qualitative)

Evaluation Criteria	Evaluation Sub-Criteria	Evaluation Criteria Components			
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How will results be measured		What is being measured and why	Technical basis for why criteria is being used	Description of how success or failure will be measured	Description of tool to be used
	Reliability of Technology	Alternative has been demonstrated to be effective in P load reduction and/or its operational theory and application indicates that the technology is likely to reduce phosphorus loads on a long-term basis.	Alternatives selected should provide long term P load reduction.	Alternatives capable of target P load reductions for 25+ years.	Technical Assessment (qualitative)

Appendix B – Evaluation Criteria Fact Sheets

Lake Okeechobee Protection Program	**Havens 1/2**
Evaluation Criteria:	Protect native flora and fauna (in-lake)
Evaluation Sub-Criteria:	Reduce exotic species

Performance Measure

Description: (What is being measured and why)

This performance measure considers the effectiveness of programs to reduce or eliminate exotic plants (the main focus is on *Melaleuca*, Brazilian pepper, and torpedograss) in the lake. The LOPA [Section (3)(e)] calls for the coordinating agencies to "identify the exotic species that threaten the native flora and fauna in the Lake Okeechobee watershed and develop and implement measures to protect the native flora and fauna." The Lake Okeechobee watershed includes the lake and its surrounding drainage basins. Within the lake, the major ecological impacts from exotic species are due to expansion of three exotic plants – *Melaleuca*, Brazilian pepper (*Schinus terebinthifolius*), and torpedograss (*Panicum repens*). The State has been carrying out an aggressive program to control *Melaleuca* and Brazilian pepper for several years, with good success. Torpedograss control now is a top priority, because it continues to rapidly expand into valuable native habitat in the lake's littoral zone.

Rationale: (Technical basis for why the evaluation criteria is being utilized)

Torpedograss has taken over more than 15,000 acres of the lake's littoral marsh, replacing a diverse open community of native plants with a dense mono-culture of grass with thick thatch and anoxic water. Native animals are not able to survive in this habitat. To a certain extent, the expansion of torpedograss can be slowed by maintaining water levels in the lake above the minimum flow and level (MFL) criterion, because the plants cannot successfully invade new areas unless the soils are nearly exposed. However, the recent drought clearly showed that we do not have the ability to prevent such events from occurring. Once torpedograss becomes established, it can tolerate a wide range of water levels, and only can be removed by an eradication program (with fire, herbicide, and/or potential biological agents that are yet to be identified).

Target: (Specific description of how success or failure will be measured)

The target is to reduce the spatial extent of torpedograss and other exotic plants from the present amount of >15,000 acres to a very small area (<500 acres) that can be maintained, and to have native wetland plant communities and their associated faunal assemblages become re-established where the torpedograss and other exotic plants are removed.

Evaluation Method: (Description of what model or analytical method will be utilized)

Different methods of control (including fire, particular herbicides, and biological agents) will be evaluated based on (a) past controlled field and laboratory studies conducted with torpedograss and other exotic plants from Lake Okeechobee, (b) results from recent efforts by the SFWMD, FDEP, and FFWCC to control torpedograss and other exotic plants in the Indian Prairie and Moore Haven regions of the lake's littoral zone, and (c) if available, any relevant information regarding torpeodgrass and other exotic plant control in other subtropical wetland systems. The evaluation will consider four particular attributes for any given control method that is to be considered:

1. The number of acres per year of torpedograss and other exotic plants that can be treated using the particular method, considering all applicable constraints (e.g., permitting for new herbicides, need for certain environmental conditions such as flooding or drying to increase effectiveness).
2. The potential long-term effectiveness of the method for controlling torpedograss and other exotic plants,

Lake Okeechobee Protection Program	**Havens 1/2**

in terms of number of years of expected successful control.

3. The estimated cost per acre of using the method.
4. The estimated level of risk of the method to non-target species of plants, on a rank scale from 0 to 5 (5 being the greatest level of risk).
5. The extent to which the method is "proven" to be effective based on past use in south Florida wetlands, on a rank scale from 0 to 5 (5 being the highest certainty).

Comments: (If applicable)

The scoring for this performance measure will be based, to a large extent, on the input of experts in the field of aquatic plant management. It may be difficult to quantify the degree of uncertainty associated with the results of scoring performance measures.

This performance measure is intimately linked to the performance measure "protect or enhance native flora and fauna," since an alternative that is successful in long-term control of torpedograss and other exotic plants will open up habitat for the native biota.

Lake Okeechobee Protection Program	**Havens 2/2**
Evaluation Criteria:	Protect native flora and fauna (in-lake)
Evaluation Sub-Criteria:	Protect native flora and fauna

Performance Measure

Description: (What is being measured and why)

This performance measure considers the effectiveness of programs to protect native flora and fauna in the lake, specifically by removal of exotic plants to open up habitat for colonization by the native biota. The LOPA [Section (3)(e)] calls for the coordinating agencies to control exotic species in the watershed and "develop and implement measures to protect the native flora and fauna." The Lake Okeechobee watershed includes the lake and its surrounding drainage basins. Within the lake, programs under the LOPA will focus on eradication of exotic plants that now occupy over 15,000 acres of habitat that formerly supported a diverse community of native flora and fauna. This performance measure evaluates the establishment of new habitat for the native biota.

Rationale: (Technical basis for why the evaluation criteria is being utilized)

The littoral zone of Lake Okeechobee provides over 180 square miles of potential wetland habitat for fish, wading birds, migratory water fowl, federally endangered Everglades Snail Kite, and other wildlife. A substantial part of this habitat has been taken over by exotic and nuisance plants, in particular torpedograss (*Panicum repens*), *Melaleuca*, Brazilian pepper (*Schinus terebinthifolius*) and cattail (*Typha latifolia*). Under the LOPA, a program is required to protect the native flora and fauna. This will be accomplished by active eradication of the exotic plants, and subsequent natural re-colonization by native plants and animals. It is recognized that establishment of a more favorable hydrologic regime (by CERP projects) and reduced nutrient inputs also will be necessary to ensure a healthy littoral zone. However, at this time there are no readily available tools to provide a quantitative estimate of how various alternatives for nutrient control will affect the littoral plants (although a model now is under development), and the LOPP in itself is not expected to dramatically alter the lake's hydrology. Therefore, for pragmatic reasons, the focus of this evaluation of the alternatives will be on the extent to which new habitat can be created for native species by exotic plant control.

Target: (Specific description of how success or failure will be measured)

The target is to have nearly all of the existing acreage of live and dead *Melaleuca*, Brazilian pepper, and torpedograss re-colonized by native plant and animal communities, and to have a substantial decline in cattail, with replacement by a more diverse and open community of marsh plants.

Evaluation Method: (Description of what model or analytical method will be utilized)

Given the focus on new habitat created by removal of exotics (and cattail), this performance measure will be evaluated simply on the basis of long-term success of exotic plant control alternatives. The alternative that provides the best long-term control of exotics, with minimal collateral damage to native plants will be considered optimal.

Comments: (If applicable)

The scoring for this performance measure will be based, to a large extent, on the input of experts in the field of aquatic ecology and plant management. It may be difficult to quantify the degree of uncertainty associated with the results of scoring performance measures.

Lake Okeechobee Protection Program	**Fox 1/4**
Evaluation Criteria: Protect Native Flora and Fauna (in lake)	
Evaluation Sub-Criteria: Impact State-Listed Species	
Performance Measure	
Description: (What is being measured and why) Restore and maintain the biodiversity of native habitat to aid in the recovery of state-listed species.	
Rationale: (Technical basis for why the evaluation criteria is being utilized) Loss of habitat through land use conversions, wetland drainage, hydrology alterations, and water quality degradation are often limiting factors for many species.	
Target: (Specific description of how success or failure will be measured) No decline in abundance of state-listed flora and fauna species.	
Evaluation Method: (Description of what model or analytical method will be utilized) Estimated benefits, in terms of potential new habitat created, and protection of existing habitat.	
Comments: (If applicable)	

Lake Okeechobee Protection Program	**O'Dell 1/3**
Evaluation Criteria:	Protect Native Flora and Fauna (Watershed)
Evaluation Sub-Criteria:	Reduce Exotic Species
Performance Measure	
Description: (What is being measured and why) The plant species listed below are found in the *Lake Okeechobee Exotic Species Plan* and include: torpedograss, melaleuca, Brazilian pepper, Old World climbing fern, hyrdilla, water hyacinth, water lettuce. Management efforts for animal species are focused on public conservation lands, and include the feral pig, blue tilapia, Asian swamp eel, fire ant, spiney water flea, Asiatic clam, sailfin catfish. The listed species have been determined to be the primary species within the Lake Okeechobee Watershed that require management of existing invasions or, in the case of some animal species, monitoring of future invasions.	
Rationale: (Technical basis for why the evaluation criteria is being utilized) Pursuant to 373.4595 (3) (e), F.S. an Exotic Species Plan was required to be developed for Lake Okeechobee to; 1) Identify the exotic species that threaten native flora and fauna within the Lake Okeechobee Watershed and 2) develop and implement measures to protect native flora and fauna.	
Target: (Specific description of how success or failure will be measured) The goal of each primary exotic plant species is "maintenance control" as a method of managing exotic plants in which control techniques are utilized on a continuous basis in order to maintain a plant population at the lowest feasible level. The number of acres to be removed is summarized on an annual basis for each species in the *Lake Okeechobee Exotic Species Plan.* Maintenance control results in the use of less herbicides, less organic deposition in aquatic environments, less overall environmental impacts from the weeds and their management, and reduced management costs.	
Evaluation Method: (Description of what model or analytical method will be utilized) For the *Lake Okeechobee Protection Program Exotic Species Plan*, five program components have been developed: 1) implement management plan, 2) assess and map coverage, 3) conduct research, and 4) transfer information via regular meetings and 5) treat with various control methodologies. Each component is important to achieve a comprehensive approach to exotic plant management. Existing management efforts and future plans for exotic plant species control by state and federal agencies in the Lake Okeechobee Watershed (LOW) form the basis of the implementation phase.	
Comments: (If applicable) While there are other exotic species within the LOW that threaten agriculture and warrant additional focus, the Exotic Species Plan only addresses exotic species that threaten *native flora and fauna*. While it is relatively easy to determine the extent to which exotic species invade native areas, the impact of exotic animals on native communities and on those species with which they compete directly is frequently less obvious.	

Lake Okeechobee Protection Program	**Fox 2/4**
Evaluation Criteria: Protect Native Flora and Fauna (in watershed)	
Evaluation Sub-Criteria: Protect, Enhance or Create Native Flora and Fauna (1) Improve hydrology, (2) Protect	
Performance Measure	
Description: (What is being measured and why) Opportunity for expansion of native plants and animals due to control of exotics, and through natural hydrology improvements.	
Rationale: (Technical basis for why the evaluation criteria is being utilized) Under LOPA, the Lake Okeechobee Exotic Species Control Program was developed to 1) Identify the exotic species that threaten native flora and fauna within the Lake Okeechobee Watershed and 2) develop and implement measures to protect native flora and fauna.	
Target: (Specific description of how success or failure will be measured) Increase in spatial extent of native habitat.	
Evaluation Method: (Description of what model or analytical method will be utilized) Estimated benefits, in terms of potential new habitat created, and protection of existing habitat.	
Comments: (If applicable)	

Lake Okeechobee Protection Program	**Fox 3/4**
Evaluation Criteria: Protect Native Flora and Fauna (watershed)	
Evaluation Sub-Criteria: Impact State-Listed Species	
Performance Measure	
Description: (What is being measured and why) Restore and maintain the biodiversity of native habitat to aid in the recovery of state-listed species.	
Rationale: (Technical basis for why the evaluation criteria is being utilized) Loss of habitat through land use conversions, wetland drainage, hydrology alterations, and water quality degradation are often limiting factors for many species.	
Target: (Specific description of how success or failure will be measured) No decline in abundance of state-listed flora and fauna species.	
Evaluation Method: (Description of what model or analytical method will be utilized) Estimated benefits, in terms of potential new habitat created, and protection of existing habitat.	
Comments: (If applicable)	

Lake Okeechobee Protection Program	**Shugar 1/7**
Evaluation Criteria:	Achieve state water quality standards
Evaluation Sub-Criteria:	Meet other water quality standards in Lake Okeechobee
Performance Measure	
Description: (What is being measured and why) The water quality of Lake Okeechobee will be evaluated for compliance with FDEP's Florida Administrative Code (FAC) 62-302	
Rationale: (Technical basis for why the evaluation criteria is being utilized) Water quality improvements within Lake Okeechobee will help to support overall environmental restoration of Lake Okeechobee and the Everglades. LOPA requires that water quality standards are achieved and maintained in Lake Okeechobee, its watershed and downstream receiving waters. Water quality standards established by the State (62-302, FAC) area based on extensive research and are established and defensible parameters by which impacts on water quality can be evaluated and measured.	
Target: (Specific description of how success or failure will be measured) Zero or minimal exceedances of water quality criteria (62-302, FAC)	
Evaluation Method: (Description of what model or analytical method will be utilized) A qualitative evaluation will be completed to determine the likelihood of exceedances with 62-302, FAC in Lake Okeechobee. This evaluation will consider the potential for changes to certain water quality constituents within Lake Okeechobee due to the implementation of a project/technology. This evaluation will be based on site-specific data including, but not limited to landuse and soil information, project/technology performance, and location of project/technology from Lake Okeechobee. The alternative will be given a high, moderate or low designation with respect to likelihood of compliance with 62-302, FAC.	
Comments: (If applicable) Different technologies/projects will address different water quality constituents. Projects/technologies implemented within the Lake Okeechobee watershed are expected to yield a net water quality benefit and may not be able to attain all water quality standards individually.	

Lake Okeechobee Protection Program	**Shugar 2/7**
Evaluation Criteria:	Achieve state water quality standards
Evaluation Sub-Criteria:	Improve tributary water quality
Performance Measure	
Description: (What is being measured and why) The tributaries will be evaluated for compliance with FDEP's Florida Administrative Code (FAC) 62-302	
Rationale: (Technical basis for why the evaluation criteria is being utilized) Water quality improvements within the watershed will help to support overall environmental restoration of Lake Okeechobee and the Everglades. LOPA requires that water quality standards are achieved and maintained in Lake Okeechobee, its watershed and downstream receiving waters. Water quality standards established by the State (62-302, FAC) area based on extensive research and are established and defensible parameters by which impacts on water quality can be evaluated and measured.	
Target: (Specific description of how success or failure will be measured) Zero or minimal exceedances of water quality criteria (62-302, FAC)	
Evaluation Method: (Description of what model or analytical method will be utilized) A qualitative evaluation will be completed to determine the likelihood of exceedances with 62-302, FAC in the tributaries. This evaluation will consider the potential for changes to certain water quality constituents in a tributary where a project/technology is considered. This evaluation will be based on site-specific data including, but not limited to landuse and soil information, project/technology performance, and location of project/technology along tributary. The alternative will be given a high, moderate or low designation with respect to likelihood of compliance with 62-302, FAC.	
Comments: (If applicable) Different technologies/projects will address different water quality constituents. Projects/technologies implemented within the Lake Okeechobee watershed are expected to yield a net water quality benefit and may not be able to attain all water quality standards individually.	

Lake Okeechobee Protection Program	**Shugar 3/7**
Evaluation Criteria:	Maintain state water quality standards
Evaluation Sub-Criteria:	Identify/control changes in water quality from projects/technologies
Performance Measure	
Description: (What is being measured and why) The water quality from the project/technology discharge will be evaluated for compliance with FDEP's Florida Administrative Code (FAC) 62-302	
Rationale: (Technical basis for why the evaluation criteria is being utilized) Water quality improvements within the Lake Okeechobee watershed will help to support overall environmental restoration of Lake Okeechobee and the Everglades. LOPA requires that water quality standards are achieved and maintained in Lake Okeechobee, its watershed and downstream receiving waters. Water quality standards established by the State (62-302, FAC) area based on extensive research and are established and defensible parameters by which impacts on water quality can be evaluated and measured.	
Target: (Specific description of how success or failure will be measured) Zero or minimal exceedances of water quality criteria (62-302, FAC)	
Evaluation Method: (Description of what model or analytical method will be utilized) A qualitative evaluation will be completed to determine the likelihood of exceedances with 62-302, FAC from project/technology discharges. This evaluation will consider the potential for changes to certain water quality constituents within Lake Okeechobee and tributaries due to the implementation of a project/technology. This evaluation will be based on site-specific data including, but not limited to landuse and soil information, project/technology performance, and location of project/technology, and ability to modify the performance of the technology/project. The alternative will be given a high, moderate or low designation with respect to likelihood of compliance with 62-302, FAC.	
Comments: (If applicable) Different technologies/projects will address different water quality constituents. Projects/technologies implemented within the Lake Okeechobee watershed are expected to yield a net water quality benefit and may not be able to attain all water quality standards individually. However, an alternative cannot cause or contribute to the degradation of water quality.	

Lake Okeechobee Protection Program	**Shugar 4/7**
Evaluation Criteria:	Maintain state water quality standards
Evaluation Sub-Criteria:	Sustain performance
Performance Measure	
Description: (What is being measured and why) The water quality from the project/technology discharge, to the tributary and Lake Okeechobee will be evaluated for long-term compliance with FDEP's Florida Administrative Code (FAC) 62-302	
Rationale: (Technical basis for why the evaluation criteria is being utilized) Water quality improvements within the Lake Okeechobee watershed will help to support overall environmental restoration of Lake Okeechobee and the Everglades. LOPA requires that water quality standards are achieved and maintained in Lake Okeechobee, its watershed and downstream receiving waters. Water quality standards established by the State (62-302, FAC) area based on extensive research and are established and defensible parameters by which impacts on water quality can be evaluated and measured.	
Target: (Specific description of how success or failure will be measured) Zero or minimal exceedances of water quality criteria (62-302, FAC)	
Evaluation Method: (Description of what model or analytical method will be utilized) A qualitative evaluation will be completed to determine the likelihood of future exceedances with 62-302, FAC from project/technology discharges, in the tributaries and Lake Okeechobee. This evaluation will consider the potential for changes to certain water quality constituents within Lake Okeechobee and tributaries due to the long-term operation of a project/technology. This evaluation will be based on site-specific data including project/technology performance, life of project/technology, and ability to modify the performance of the technology/project to deal with changes in water quality. The alternative will be given a high, moderate or low designation with respect to likelihood of compliance with 62-302, FAC.	
Comments: (If applicable) Different technologies/projects will address different water quality constituents. Projects/technologies implemented within the Lake Okeechobee watershed are expected to yield a net water quality benefit and may not be able to attain all water quality standards individually. However, an alternative cannot cause or contribute to the degradation of water quality.	

Lake Okeechobee Protection Program	**Shugar 5/7**
Evaluation Criteria: Meet 2015 TMDL	
Evaluation Sub-Criteria: Reduce external phosphorus loads to Lake Okeechobee	
Performance Measure	
Description: (What is being measured and why) The average annual phosphorus load reduction to Lake Okeechobee from project/technology will be estimated in metric tons. The standard deviation will be determined for the period of record simulation to indicate the variability of the phosphorus load reduction. The reduction in phosphorus loads to Lake Okeechobee, attributed to the project/technology, will significantly aid in the overall reduction of total phosphorus loading to Lake Okeechobee.	
Rationale: (Technical basis for why the evaluation criteria is being utilized) Water quality in the Lake Okeechobee watershed has experienced substantial degradation over the last century. Anthropogenic inputs have resulted in the nutrient enrichment of Lake Okeechobee and its tributaries. Thus, reversing the historic trend of water quality degradation and nutrient enrichment will: 1) improve ecological health by increasing native wildlife diversity and abundance; 2) decrease occurrences of algal blooms; 3) decrease nutrient dependent benthic organisms; 4) reverse impairments in designated uses; 5) reduce costs of water treatment for drinking purposes and 6) improve the quality of water flowing to downstream ecosystems including the Everglades. Reduction in phosphorus load will provide water quality improvements to support the ecological restoration of Lake Okeechobee. LOPA requires that phosphorus sources in the watershed are controlled and managed better to achieve and maintain water quality in Lake Okeechobee, its watershed and downstream receiving waters and restore these waters.	
Target: (Specific description of how success or failure will be measured) Maximize the annual phosphorus load reduction and minimize the standard deviation or variability in performance according to the TMDL of 140 tonnes.	
Evaluation Method: (Description of what model or analytical method will be utilized) Model (WAMView) predictions will be used to forecast total phosphorus loads (tonnes/year) discharged to Lake Okeechobee from the projects/technologies. The forecasted loads will then be compared to the target value.	
Comments: (If applicable)	

Lake Okeechobee Protection Program	**Shugar 6/7**
Evaluation Criteria: Meet 2015 TMDL	
Evaluation Sub-Criteria: Increase exports and decrease imports of phosphorus from the watershed	
Performance Measure	
Description: (What is being measured and why) Opportunities will be evaluated that will promote increases in exports and decrease of imports of phosphorus into the watershed. The average annual phosphorus imported or exported from the watershed through the implementation of the project/technology will be estimated in metric tons. The reduction in phosphorus loads to Lake Okeechobee, attributed to the project/technology, will significantly aid in the overall reduction of total phosphorus loading to Lake Okeechobee.	
Rationale: (Technical basis for why the evaluation criteria is being utilized) Water quality in the Lake Okeechobee watershed has experienced substantial degradation over the last century. Anthropogenic inputs have resulted in the nutrient enrichment of Lake Okeechobee and its tributaries. Thus, reversing the historic trend of water quality degradation and nutrient enrichment will: 1) improve ecological health by increasing native wildlife diversity and abundance; 2) decrease occurrences of algal blooms; 3) decrease nutrient dependent benthic organisms; 4) reverse impairments in designated uses; 5) reduce costs of water treatment for drinking purposes and 6) improve the quality of water flowing to downstream ecosystems including the Everglades. Reduction in phosphorus load will provide water quality improvements to support the ecological restoration of Lake Okeechobee. LOPA requires that phosphorus sources in the watershed are controlled and managed better to achieve and maintain water quality in Lake Okeechobee, its watershed and downstream receiving waters and restore these waters.	
Target: (Specific description of how success or failure will be measured) Reduction in the amount of phosphorus imported into the watershed and increase in the amount of phosphorus exported from the watershed (measured in tonnes/year). Maximize the annual phosphorus load reduction to Lake Okeechobee according to the TMDL of 140 tonnes.	
Evaluation Method: (Description of what model or analytical method will be utilized) Model (WAMView) the total phosphorus load changes resulting from decreasing imports and increasing exports from the projects/technologies and the effect on phosphorus loads entering Lake Okeechobee.	
Comments: (If applicable)	

Lake Okeechobee Protection Program	**Shugar 7/7**
Evaluation Criteria:	Meet 2015 TMDL
Evaluation Sub-Criteria:	Reduce phosphorus loads to tributaries
Performance Measure	
Description: (What is being measured and why) The phosphorus load reduction to the tributaries in the Lake Okeechobee watershed will be determined by evaluating the length and number of tributaries and canals with reduced phosphorus concentrations and receive reduced phosphorus loads as a result of implementing projects/technologies.	
Rationale: (Technical basis for why the evaluation criteria is being utilized) Water quality improvements within the Lake Okeechobee watershed will help to support overall environmental restoration of Lake Okeechobee and the Everglades. LOPA requires that phosphorus sources in the watershed are controlled and managed better to achieve and maintain water quality in Lake Okeechobee, its watershed and downstream receiving waters.	
Target: (Specific description of how success or failure will be measured) Maximize the increase in length and number of tributaries with reduced phosphorus concentrations and phosphorus load due to projects implemented	
Evaluation Method: (Description of what model or analytical method will be utilized) The WAMView model will be utilized to determine the changes in phosphorus concentrations within the tributaries, as well as changes in loads to the tributaries. The model results for individual segments will be weighted based on the length of the tributary and the number of tributaries affected. Add	
Comments: (If applicable)	

Lake Okeechobee Protection Program	**O'Dell 2/3**
Evaluation Criteria: Minimize Negative Economic Impact on Land Owners	
Evaluation Sub-Criteria: Regional Cost (tax base, jobs, etc)	
Performance Measure	
Description: (What is being measured and why) Determine the benefit- cost analysis of a proposed P reduction measure/alternative to the regional community, in terms of changes in income. Income is defined as employee compensation, proprietor's income, interest, rents, profits, sales taxes, including business and household property taxes. The measurement is the present value of the annual change in "Total Value Added" (i.e. regional income) resulting from the P reduction measure/alternative relative to baseline conditions. The change in regional income can be estimated for P reduction measures/alternatives that directly remove land from profitable use and/or that result in a change in agricultural productivity and/or that result in a net change in exports associated with the P reduction measure/alternatives construction and operation activities.	
Rationale: (Technical basis for why the evaluation criteria is being utilized) If regional income is determined to be negative, then the reduced income from removing land from productive agriculture is greater than the income generated from increases in agricultural productivity and/or from local expenditures related to the capital and O&M costs of the P reduction measure/alternative. If regional income is positive, then the income generated from the P reduction measure/alternative is greater than the reduced income from removing land from agricultural production. The change in regional income is very much dependent on how much of the P reduction measure/alternative costs are paid for by residents and businesses located within the area.*	
Target: (Specific description of how success or failure will be measured) No negative impacts from P reduction measures/alternatives implementation, such as landowners going out of business as a consequence of implementing a P reduction measure/alternative. Preferably, the outcome would be an increase in regional income as investments are made to implement, maintain, and use the P reduction measure/alternative.	
Evaluation Method: (Description of what model or analytical method will be utilized) Existing IMPLAN Regional Economic Input-Output Model, which simulates the supply of, and demand, for good and services within a county or group of counties. It can estimate the extent to which new investments or increases in demand affect a region's economy in terms of sales, income and employment.	
Comments: (If applicable) *If a P reduction measure/alternative is funded from sources outside of the study area, there would be no negative financial impacts to residents and businesses associated with the costs of implementing the BMP. Financing of P reduction measure/alternative is critical to how its implementation will affect regional income.	

Lake Okeechobee Protection Program	**Fox 4/4**
Evaluation Criteria: Minimize Negative Economic Impact on Regional Economy	
Evaluation Sub-Criteria: Recreational Opportunities	
Performance Measure	
Description: (What is being measured and why) Increase consumptive and non-consumptive use of the BMP area by the public.	
Rationale: (Technical basis for why the evaluation criteria is being utilized) Offset any negative impacts of taking land off regional tax rolls due to BMP implementation	
Target: (Specific description of how success or failure will be measured) Any increase in fishing, birdwatching and waterfowl hunting would be a positive benefit to the region, since there is no public use now.	
Evaluation Method: (Description of what model or analytical method will be utilized) Estimated benefits of public use areas.	
Comments: (If applicable)	

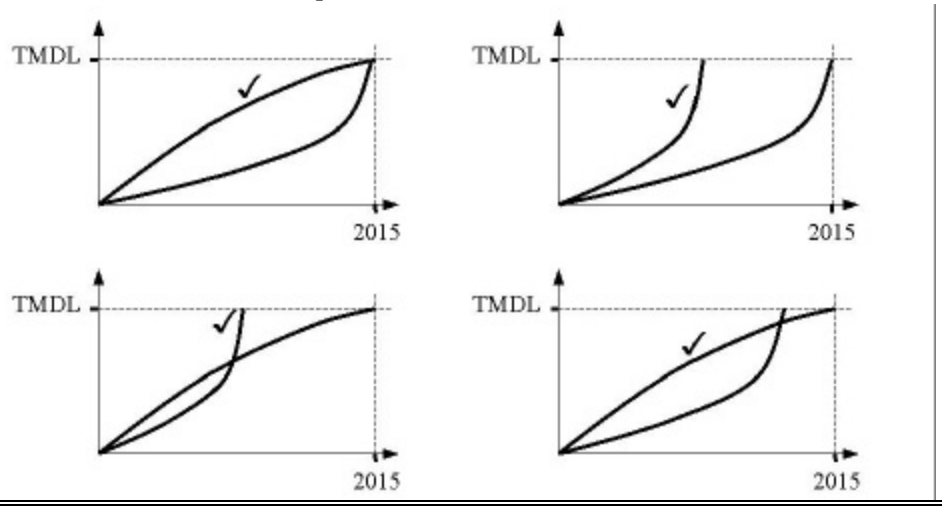
Lake Okeechobee Protection Program	**Hornung 1/1**
Evaluation Criteria: Cost	
Evaluation Sub-Criteria: Maximize Federal Cost Sharing	
Performance Measure	
Description: (What is being measured and why) The alternative will be evaluated to identify whether there are federal programs that might be available to provide all or a portion of the funding for its implementation.	
Rationale: (Technical basis for why the evaluation criteria is being utilized) The Lake Okeechobee Protection Act requires that the Lake Okeechobee Protection Plan be developed with a view towards maximizing federal cost sharing. This will relieve the economic burden on land owners and the participating state agencies and could increase the breadth of potential measures that could be implemented.	
Target: (Specific description of how success or failure will be measured) The Lake Okeechobee Protection Act requires that the level of federal cost sharing be maximized.	
Evaluation Method: (Description of what model or analytical method will be utilized) An inventory will be performed of all federal programs that could potentially provide funding for components of the LOPP. Each component of an alternative plan will be evaluated to determine if it might meet the requirements of any federal programs that might provide cost sharing. It will be assumed that the CERP project features will be in place for each alternative to be considered and therefore, will not be a factor in this evaluation. Federal programs that would be considered are as follows: NRCS programs will be considered – CREP, WRP, PL 599 Corps of Engineers programs (beyond CERP) – Section 1135, Section 201 DOT programs will be considered – Ice Tea??? USFWS programs -- ??? EPA programs --???? The alternatives will be ranked based on the extent of potential federal participation for all of the programs listed above.	
Comments: (If applicable)	

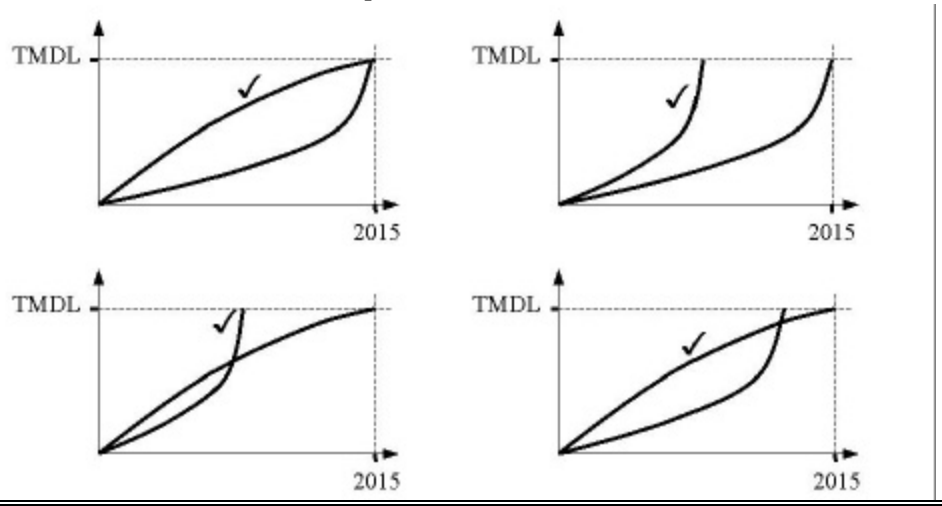
Lake Okeechobee Protection Program	**Whalen 1/1**
Evaluation Criteria: Cost	
Evaluation Sub-Criteria: Increase Public/Private Partnerships	
Performance Measure	
Description: (What is being measured and why) Establishment of partnerships for the funding of regional projects that involve public-private cost sharing that will reduce phosphorus discharges into Lake Okeechobee. A Public-Private Partnership is a relationship between the public and private sectors where there is a sharing of risk, responsibility and reward, and where this is a net benefit to the public. Specifically, the partnership is for some combination of design, construction, financing, operation and/or maintenance of public infrastructure, which may rely on user fees or alternative sources of revenue to cover all or part of the related costs of capital projects and/or associated maintenance.	
Rationale: (Technical basis for why the evaluation criteria is being utilized) LOPA requires that the cooperating agencies develop a public- private partnership program. The FDEP has set a TMDL of 140 metric tons of P into the lake on an annual basis, in order to achieve the 40 ppb in-lake goal. Implementation of the TMDL will follow a phased approach and will begin with the initiation of activities intended to reduce phosphorus loads from the watershed. Competition for funding of regional reduction projects within this program is the impetus for public-private cost sharing, with public benefits that include socio-economic impacts and public interaction with projects.	
Target: (Specific description of how success or failure will be measured) Implementation of a public-private regional project (s) that results in a reduction of P loads to the lake, and maximizes the amount of private dollars contributed.	
Evaluation Method: (Description of what model or analytical method will be utilized) Evaluation Criteria for potential projects included: P load reduction to the lake; priority basin benefits; ability to measure results of the proven technology; estimated cost per pound of P removed; cost-sharing (% from private and % from public); level of risk; stability/qualifications/ references of partners; adherence to budget requirements; ease of permitting; habitat creation or enhancement; water retention; water quality or other environmental benefits.	
Comments: (If applicable) Currently, proposals for the regional public-private partnership program have been reviewed and ranked. The District's Governing Board needs to approve entering into negotiations with the top-ranked projects.	

Lake Okeechobee Protection Program	**O'Dell 3/3**
Evaluation Criteria: Cost	
Evaluation Sub-Criteria: $/lb of P Removed From Inflow (must be evenly applied)	
Performance Measure	
Description: (What is being measured and why) Average cost per pound of P removed by each P reduction alternative. This measurement is the present value of P reduction alternative costs divided by the present value of the reduction in P at the inflow to the lake, due to the P reduction alternative. Costs include the construction, implementation, O and M of the phosphorus reduction alternative, the costs to government agencies to implement the measures, and any estimated changes in costs or revenues to landowners with a discount rate applied.	
Rationale: (Technical basis for why the evaluation criteria is being utilized) Standardizes the cost-effectiveness of a P reduction alternative as it reduces P loads to Lake Okeechobee.	
Target: (Specific description of how success or failure will be measured) Comparing the cost per pound of P removed will assist in determining which P reduction alternative, or suite of alternatives, may be the most cost effective with respect to P removal.	
Evaluation Method: (Description of what model or analytical method will be utilized) Existing cost-benefit data for various P reduction alternatives are available from several District technical studies that conducted economic analyses. The available data will have to be standardized using a uniform study period, discount rate, etc.	
Comments: (If applicable)	

Lake Okeechobee Protection Program	**Mitnik 1/2**
Evaluation Criteria: Impact Existing Permitted Users	
Evaluation Sub-Criteria: Impact water supply	
Performance Measure	
Description: (What is being measured and why) The volume of increased or reduced surface water supply available	
Rationale: (Technical basis for why the evaluation criteria is being utilized) The quantity and quality of existing water supply is preserved at, or above the existing levels when the project is implemented.	
Target: (Specific description of how success or failure will be measured) Avoid any reductions in existing water supply in the watershed and if possible, to increase the availability of water supply.	
Evaluation Method: (Description of what model or analytical method will be utilized) This evaluation criteria will consider impacts on water supply in the Lake Okeechobee Watershed. Any potential changes in the availability of water supply from Lake Istokpoga will be quantified. Potential changes on water supply availability will be qualitatively evaluated based on interpretation of the model results.	
Comments: (If applicable)	

Lake Okeechobee Protection Program	**Mitnik 2/2**
Evaluation Criteria: Impact Existing Permitted Users	
Evaluation Sub-Criteria: Impact flood protection	
Performance Measure	
Description: (What is being measured and why) The Program is not designed to enhance flood protection. Any impacts on existing flood protection will be reflected by changes in canal stages. Increases or decreases in the duration of high wet season canal stages will be evaluated. An increase in wet season canal stages will reflect an increase in flows and a corresponding reduction in the capacity to remove flood runoff. Conversely, a reduction in wet season canal stages will reflect additional flood runoff conveyance capacity and an enhancement of flood protection.	
Rationale: (Technical basis for why the evaluation criteria is being utilized) The level of service for flood protection is preserved at, or above the existing levels when the project is implemented.	
Target: (Specific description of how success or failure will be measured) The levels and duration of high wet season canal stages will remain at the existing levels to maintain flood protection. Lower canal stages or a reduced duration of high stages during the wet season will be an indication of enhanced flood protection.	
Evaluation Method: (Description of what model or analytical method will be utilized) The model results will be used to compare canal stages in the without project conditions with those for the alternative being evaluated. An increase (or a reduction) in the peak wet season canal stages will be considered as a flood protection reduction or enhancement, respectively. An increase or reduction in the percent of time with high canal stages during the wet season will likewise be considered a flood protection reduction or enhancement, respectively.	
Comments: (If applicable)	

Lake Okeechobee Protection Program	**Otero 1/2**
Evaluation Criteria: Early Results	
Evaluation Sub-Criteria: Early Load Reduction	
Performance Measure	
Description: (What is being measured and why) Measure the ability of each plan to achieve significant (50%) load reduction toward the TMDL early in the implementation schedule	
Rationale: (Technical basis for why the evaluation criteria is being utilized) Phosphorus loading to Lake Okeechobee must meet the State's water quality standards by January 1, 2015. The TMDL is 140 MT/yr (105MT/yr from runoff). Achieving significant load reductions in the early stages of the plan will allow the Lake to begin its recovery earlier.	
Target: (Specific description of how success or failure will be measured) ?? plan achieving significant reduction earliest = highest score ?? plan achieving significant reduction latest = lowest score ?? score other plans by prorating accordingly	
Evaluation Method: (Description of what model or analytical method will be utilized) Estimate year when 50% load reduction will occur. Use implementation schedules from similar projects and load reduction performance for similar projects or from literature. If possible, account for actual loading to the Lake due to the plan's implementation.	
Comments: (If applicable) Computer models will not be available to simulate the load reduction of each alternative plan over time, given the time constraints of the LO Protection Plan development. Graphically, the two Early Results sub-criteria combine to favor the plans checked below:  	

Lake Okeechobee Protection Program	**Otero 2/2**
Evaluation Criteria: Early Results	
Evaluation Sub-Criteria: Early Implementation	
Performance Measure	
Description: (What is being measured and why) Measure the ability of each plan to achieve the TMDL prior to 2015.	
Rationale: (Technical basis for why the evaluation criteria is being utilized) Phosphorus loading to Lake Okeechobee must meet the State's water quality standards by January 1, 2015. The TMDL is 140 MT/yr (105MT/yr from runoff). Achieving the TMDL early will allow the Lake to begin its recovery earlier.	
Target: (Specific description of how success or failure will be measured) ?? plan achieving TMDL earliest = highest score ?? plan achieving TMDL latest, no later than 2015 = lowest score ?? score other plans by prorating accordingly	
Evaluation Method: (Description of what model or analytical method will be utilized) Estimate year when plan will fully meet the TMDL. Use implementation schedules from similar projects. If possible, account for actual loading to the Lake due to the plan's implementation.	
Comments: (If applicable) Computer models will not be available to estimate the date for achieving the TMDL under each alternative plan, given the time constraints of the LO Protection Plan development. Graphically, the two Early Results sub-criteria combine to favor the plans checked below:  	

Lake Okeechobee Protection Program	**Folks 1/1**
Evaluation Criteria:	Early Results
Evaluation Sub-Criteria:	Achieve Initial Phase of Phosphorus Load Reductions

Performance Measure

Description: (What is being measured and why)

This performance measure considers whether or not the alternative plan meets the Initial Phase of phosphorus load reductions contained in the SFWMD Technical Publication 81-2.

Rationale: (Technical basis for why the evaluation criteria is being utilized)

Initial load reductions are required as described in LOPA, representing an appropriate basis for the initial phase of P load reductions, and subsequent phases of P load reductions would be determined by the TMDL.

Target: (Specific description of how success or failure will be measured)

Achieve and maintain compliance with water quality standards in Lake Okeechobee and the downstream receiving waters to reduce both internal and external P loads to the lake and achieve the P load reductions set forth in Tech Pub 81-2.

Evaluation Method: (Description of what model or analytical method will be utilized)

Estimate exceedances of phosphorus load standards based on land use category and evaluate performance of proposed technology and/or projects utilizing existing models and the SFWMD's Works of the District program.

Comments: (If applicable)

Lake Okeechobee Protection Program	**Abbott 1/5**
Evaluation Criteria: Feasibility	
Evaluation Sub-Criteria: Sensitivity to Weather	
Performance Measure	
Description: (What is being measured and why) The ability of an alternative to reduce a greater amount of phosphorus load to the lake with increasing load conditions, such as above average rainfall (either seasonally or annually) and the ability of an alternative to sustain performance despite unseasonable weather conditions such as extreme drought, freezes, extreme heat, and beyond design basis storm events.	
Rationale: (Technical basis for why the evaluation criteria is being utilized) Phosphorus loads to Lake Okeechobee are typically greater than average in wet years, so there is a need for alternatives to provide greater phosphorus load reduction under those conditions. Additionally, the viability of the technology should not be threatened by infrequent weather conditions such as drought, freezes, etc. Alternatives selected should provide phosphorus load reductions commensurate with the total lake load for a given year and should remain effective during and after adverse weather events and conditions.	
Target: (Specific description of how success or failure will be measured) Alternatives providing a commensurate fraction of phosphorus load reduction for wet years when compared to average years will meet the target. Alternatives providing a lower fraction of phosphorus load reduction for wet years when compared to average years will fall short of the target. Alternatives not affected or minimally affected by adverse weather events or conditions will meet the target, and likewise those substantially affected will fall short of the target.	
Evaluation Method: (Description of what model or analytical method will be utilized) A technical assessment performed by a sub-team will evaluate each alternative utilizing existing documents and reports on the various technologies. This includes the Desktop Evaluation of the Lake Okeechobee Alternate Nutrient Reduction Technologies and its references. Alternatives will be assigned a high, moderate or low level of confidence rating for providing load reduction commensurate with total load based on the qualitative evaluation. Alternatives will be assigned a no impact, low, moderate or high impact rating for effect of adverse weather events or conditions.	
Comments: (If applicable)	

Lake Okeechobee Protection Program	**Abbott 2/5**
Evaluation Criteria: Feasibility	
Evaluation Sub-Criteria: Acceptability (Socioeconomic)	
Performance Measure	
Description: (What is being measured and why) The socioeconomic impacts, both beneficial and adverse, will be assessed. These include such factors as impact to residents, businesses, infrastructure (transportation, schools/libraries, public health services, social services, water supply, parks, law enforcement, waste management, etc.), employment, health and safety, tax base, environmental justice, local stakeholder acceptance, etc.	
Rationale: (Technical basis for why the evaluation criteria is being utilized) Consideration of socioeconomic impacts is necessary for decision making having regional impact, such as the Lake Okeechobee watershed. Evaluation of socioeconomic impacts is part of the normal decision making process for federal, state, and local governments. Adverse impacts should be minimized and beneficial impacts maximized.	
Target: (Specific description of how success or failure will be measured) Beneficial socioeconomic impacts should substantially outweigh adverse socioeconomic impacts to the community. The 2001 conditions described in the Natural Resource Analysis of Lake Okeechobee Phosphorus Management Strategies and the Lake Okeechobee Sediment Management Feasibility Study, Appendix D, Socioeconomic Evaluation Study will be considered baseline.	
Evaluation Method: (Description of what model or analytical method will be utilized) The impacts will be assessed by a sub-team as being beneficial or adverse and high, medium, low or no impact using professional judgment and existing studies of alternatives including, but not limited to, the Natural Resource Analysis of Lake Okeechobee Phosphorus Management Strategies. The results will be tabularized and a conclusion drawn on the whether the beneficial socioeconomic impacts outweigh the projected adverse impacts.	
Comments: (If applicable) The sub-team should first review the baseline conditions presented in the Lake Okeechobee Sediment Management Feasibility Study, Appendix D, Socioeconomic Evaluation Study to ensure accurate understanding of the baseline conditions. Then the construction period and operating period impacts for each alternative to be considered should be estimated. A matrix with each applicable socioeconomic factor, such as those listed above, should be created that provides an area for rating each factor for each alternative for both the construction period and the operating period. The team should meet to establish the ratings and rank the alternatives based on the overall assessment of the individual ratings for each alternative.	

Consideration should be made to exclude local stakeholder acceptance from this category and create a separate category for it. It deals more with public opinion as opposed to socioeconomic impacts.

Lake Okeechobee Protection Program	**Abbott 3/5**
Evaluation Criteria: Feasibility	
Evaluation Sub-Criteria: Track Record	
Performance Measure	
Description: (What is being measured and why) A qualitative measure or rating of the degree to which an alternative can be built and operated successfully to meet the project treatment goals.	
Rationale: (Technical basis for why the evaluation criteria is being utilized) Proven alternatives that can meet the project treatment goals should be selected to minimize risk and uncertainty.	
Target: (Specific description of how success or failure will be measured) Alternatives having minimal risk and uncertainty associated with design, permitting, construction and operation to meet the project treatment goals would be given a high rating.	
Evaluation Method: (Description of what model or analytical method will be utilized) A qualitative technical assessment performed by a sub-team will evaluate each alternative utilizing existing documents and reports on the various technologies. This includes the Desktop Evaluation of the Lake Okeechobee Alternate Nutrient Reduction Technologies and its references. Alternatives will be assigned a high, moderate, or low level of confidence rating based on the qualitative evaluation that considers level of experience constructing and operating the alternative. This will include consideration of whether the alternative has been demonstrated at the following levels: full scale operations, prototypes, laboratory tests, or theory of operation.	
Comments: (If applicable)	

Lake Okeechobee Protection Program	**Abbott 4/5**
Evaluation Criteria: Feasibility	
Evaluation Sub-Criteria: Operations and Maintenance	
Performance Measure	
Description: (What is being measured and why) A qualitative measure or rating of the operations and maintenance effort to sustain performance of the alternative and modify operation based on future changing conditions. This should include staffing as well as other operating, maintenance, repair, rehabilitate and replacement requirements, including the effect this has on the alternative's availability to operate.	
Rationale: (Technical basis for why the evaluation criteria is being utilized) Alternatives requiring lower ongoing operational and maintenance efforts are more likely to sustain performance and minimize unavailability. Alternatives able to adjust operation to changing conditions on a daily, seasonal, or long term trend are more likely to be viable and beneficial in future years.	
Target: (Specific description of how success or failure will be measured) Alternatives having greater operational flexibility and minimal operating and maintenance requirements to meet the project treatment goals would be given a high rating.	
Evaluation Method: (Description of what model or analytical method will be utilized) A qualitative technical assessment performed by a sub-team will evaluate each alternative utilizing existing documents and reports on the various technologies. This includes the Desktop Evaluation of the Lake Okeechobee Alternate Nutrient Reduction Technologies and its references. Alternatives will be assigned a high, moderate, or low level of operational and maintenance requirements and ability to vary operation based on the qualitative evaluation.	
Comments: (If applicable)	

Lake Okeechobee Protection Program	**Abbott 5/5**
Evaluation Criteria: Feasibility	
Evaluation Sub-Criteria: Reliability of Technology	
Performance Measure	
Description: (What is being measured and why) A qualitative measure or rating of the degree to which an alternative has been demonstrated to be effective in P load reduction and/or its operational theory and application indicates that the technology is likely to reduce phosphorus loads on a long-term basis.	
Rationale: (Technical basis for why the evaluation criteria is being utilized) Alternatives selected should provide long term P load reduction that meets or exceeds the project treatment goals.	
Target: (Specific description of how success or failure will be measured) Alternatives capable of achieving the target P load reduction for 25+ years will meet the target.	
Evaluation Method: (Description of what model or analytical method will be utilized) A technical assessment to evaluate each alternative utilizing existing documents and reports on the various technologies will be performed. This includes the Desktop Evaluation of the Lake Okeechobee Alternate Nutrient Reduction Technologies and its references.	
Comments: (If applicable)	